

**WHAT IS CLAIMED IS:**

1           1.       A method of maintaining an index during a reorganization of data in a  
2 database, wherein said database comprises one or more records and each said record  
3 includes a root segment, the method comprising:  
4           storing each root segment in a separate storage location; and  
5           retaining each root segment in its storage location during a reorganization of  
6           data in said database.

1           2.       The method of claim 1, wherein all root segments stored within a block  
2 of storage locations are stored in contiguous storage locations.

1           3.       The method of claim 1, wherein each said storage location which  
2 stores a root segment is fixed.

1           4.       The method of claim 2, wherein each said storage location which  
2 stores a root segment is fixed.

1           5.       The method of claim 1, wherein said database is an IMS full function  
2 database.

1           6.       The method of claim 3, wherein each said root segment is stored in a  
2 fixed storage location at the time it is added to the database.

1           7.     A method of maintaining an index during a reorganization of data in a  
2 database, wherein said database comprises one or more records and each said record  
3 includes a root segment and one or more non-root segments, the method comprising:  
4           storing each root segment in a separate storage location, wherein each storage  
5           location is associated with a particular block of storage locations;  
6           retaining each root segment in its storage location during a reorganization of  
7           data in said database; and  
8           storing each non-root segment, associated with a first root segment, in a block  
9           of storage locations in which said first root segment is also stored.

1           8.     The method of claim 7, wherein all root segments stored within a block  
2 of storage locations are stored in contiguous storage locations.

1           9.     The method of claim 7, wherein each said storage location which  
2 stores a root segment is fixed.

1           10.    The method of claim 8, wherein each said storage location which  
2 stores a root segment is fixed.

1           11.    The method of claim 7, wherein said database is an IMS full function  
2 database.

1           12.    The method of claim 9, wherein each said root segment is stored in a  
2 fixed storage location at the time it is added to the database.

1           13.     A method of maintaining an index during a reorganization of data in a  
2     database, wherein said database comprises one or more records, each said record  
3     includes a root segment and one or more non-root segments, and each root segment  
4     comprises a prefix component and a data component, the method comprising:  
5             storing said prefix component of each root segment in a separate storage  
6             location; and  
7             retaining said prefix component of each root segment in its storage location  
8             during a reorganization of data in said database.

1           14.     The method of claim 13, wherein all root segment prefix components  
2     stored within a block of storage locations are stored in contiguous storage locations.

1           15.     The method of claim 13, wherein each said storage location which  
2     stores a root segment prefix component is fixed.

1           16.     The method of claim 14, wherein each said storage location which  
2     stores a root segment prefix component is fixed.

1           17.     The method of claim 13, wherein said database is an IMS full function  
2     database.

1           18.     The method of claim 15, wherein each said root segment prefix  
2     component is stored in a fixed storage location at the time it is added to the database.

1           19.     A method of maintaining an index during a reorganization of data in a  
2     database, wherein said database comprises one or more records, each said record  
3     includes a root segment and one or more non-root segments, and each root and non-  
4     root segment comprises a prefix component and a data component, the method  
5     comprising:

6           storing said prefix component of each root segment in a separate storage  
7           location, wherein each storage location is associated with a particular  
8           block of storage locations;

9           retaining said prefix component of each root segment in its storage location  
10          during a reorganization of data in said database; and

11          storing said prefix component of each non-root segment which is associated  
12          with a first root segment, in a block of storage locations in which said  
13          prefix component of said first root segment is also stored.

1           20.     The method of claim 19, wherein all root segments stored within a  
2     block of storage locations are stored in contiguous storage locations.

1           21.     The method of claim 19, wherein said database is an IMS full function  
2     database.

1           22.     A method of facilitating correction of an index after a reorganization of  
2 data in a database, wherein said index comprises index entries, said database  
3 comprises one or more records, each said record comprises one or more segments,  
4 and each index entry comprises an address to a target segment, the method  
5 comprising:

6           prior to a reorganization of data in said database, assigning a unique token to  
7           each target segment and each corresponding index entry having an  
8           address to a target segment, wherein said unique token for a given  
9           target segment and for a corresponding index entry is the same;  
10          after a reorganization of data in said database, reading the unique token of a  
11          first index entry;  
12          reading the unique token of each target segment until a match is found  
13          between the unique token of a matching target segment and the unique  
14          token of said first index entry;  
15          determining the address of said matching target segment; and  
16          replacing the address of said first index entry with the address of said  
17          matching target segment.

1           23.     The method of claim 19, wherein said index which is to be corrected is  
2 a secondary index and each said segment is a non-root segment.

1           24.     The method of claim 22, wherein said database is an IMS database.

1           25.     The method of claim 23, wherein said database is an IMS database.

1           26.     A method of facilitating correction of an index after a reorganization of  
2 data in a database, wherein said index comprises index entries, said database  
3 comprises one or more records, each said record comprises a root segment and one or  
4 more non-root segments, and each index entry comprises an address to a target  
5 segment included within said root and non-root segments, the method comprising:  
6           prior to a reorganization of data in said database, assigning a unique token to  
7           each target segment and each corresponding index entry having an  
8           address to a target segment, wherein said unique token for a given  
9           target segment and for a corresponding index entry is the same;  
10          after a reorganization of data in said database, reading the unique token of a  
11          first index entry for a first record;  
12          reading the unique token of each non-root segment within said first record  
13          until a match is found between the unique token of a matching target  
14          segment and the unique token of said first index entry;  
15          determining the address of said matching target segment; and  
16          replacing the address of said first index entry with the address of said  
17          matching target segment.

1           27.     The method of claim 26, wherein said index which is to be corrected is  
2 a secondary index.

1           28.     The method of claim 26, wherein said database is an IMS database.

1           29.     The method of claim 27, wherein said database is an IMS database.

1           30.     The method of claim 26, wherein each said unique token includes one  
2 or more the following: (i) a born on date of the target segment to which said unique  
3 token is assigned; or (ii) a key field of the target segment to which said unique token  
4 is assigned.

1           31.    A method of facilitating correction of an index after a reorganization of  
2 data in a database, wherein said index comprises index entries, said database  
3 comprises one or more records, each said record comprises a root segment and one or  
4 more non-root segments, and each index entry comprises an address to a target  
5 segment included within said root and non-root segments, wherein said root segment  
6 and one or more non-root segments for a record are stored within a block of storage  
7 locations, the method comprising:

8           prior to a reorganization of data in said database, assigning a unique token to  
9           each target segment and each corresponding index entry having an  
10          address to a target segment, wherein said unique token for a given  
11          target segment and for a corresponding index entry is the same;  
12          after a reorganization of data in said database, reading the unique token of a  
13          first index entry for a first record;  
14          reading the unique token of each non-root segment within said first record  
15          until a match is found between the unique token of a matching target  
16          segment and the unique token of said first index entry;  
17          determining the address of said matching target segment; and  
18          replacing the address of said first index entry with the address of said  
19          matching target segment.

1           32.    The method of claim 31, wherein said index which is to be corrected is  
2 a secondary index.

1           33.    The method of claim 31, wherein said database is an IMS database.

1           34.    The method of claim 32, wherein said database is an IMS database.

1           35.    The method of claim 31, wherein each said root segment is stored in a  
2 fixed storage location prior to a reorganization of data in said database, and said root  
3 segment is retained in said fixed storage location during a reorganization.

1           36.     The method of claim 31, wherein each said unique token is includes  
2     one or more the following: (i) a born on date of the target segment to which said  
3     unique token is assigned; or (ii) a key field of the target segment to which said unique  
4     token is assigned.



1           37.     A method of facilitating correction of an index after a reorganization of  
2 data in a database, wherein said index comprises index entries, said database  
3 comprises one or more records, each said record comprises a root segment and one or  
4 more non-root segments, each root and non-root segment comprises a prefix  
5 component and a data component, and each index entry comprises an address to the  
6 prefix component of a target segment included within said root and non-root  
7 segments, the method comprising:

8           prior to a reorganization of data in said database, assigning a unique token to  
9           the prefix component of each target segment and each corresponding  
10          index entry having an address to the prefix component of a target  
11          segment, wherein said unique token for the prefix component of a  
12          given target segment and for a corresponding index entry is the same;  
13          after a reorganization of data in said database, reading the unique token of a  
14          first index entry for a first record;  
15          reading the unique token of the prefix component of each non-root segment  
16          within said first record until a match is found between the unique token  
17          of a matching target segment prefix component and the unique token  
18          of said first index entry;  
19          determining the address of said matching target segment prefix component;  
20          and  
21          replacing the address of said first index entry with the address of said  
22          matching target segment prefix component.

1           38.     The method of claim 37, wherein said index which is to be corrected is  
2 a secondary index.

1           39.     The method of claim 37, wherein said database is an IMS database.

1           40.     The method of claim 37, wherein each said root segment is stored in a  
2 fixed storage location prior to a reorganization of data in said database, and said root  
3 segment is retained in said fixed storage location during a reorganization.

1           41.     The method of claim 37, wherein each index entry and each non-root  
2 target segment further comprise a root segment identifier which identifies what root  
3 segment said non-root target segment is associated with, and each identified root  
4 segment comprises addresses to all non-root segments, within a record, associated  
5 with said identified root segment.

1           42.     The method of claim 41, wherein each said unique token includes one  
2 or more the following: (i) a born on date of the target segment to which said unique  
3 token is assigned; or (ii) a key field of the target segment to which said unique token  
4 is assigned.

1           43.     The method of claim 42, wherein each said unique token for an index  
2 entry and each non-root target segment further comprises said root segment identifier  
3 which identifies what root segment said non-root target segment is associated with.

1           44.     The method of claim 41, wherein said database is an IMS database.

1           45.     The method of claim 41, wherein said index which is to be corrected is  
2 a secondary index.

1           46.     The method of claim 37, wherein each said unique token includes one  
2 or more the following: (i) a born on date of the target segment to which said unique  
3 token is assigned; or (ii) a key field of the target segment to which said unique token  
4 is assigned.

1           47.     The method of claim 22, wherein after a reorganization of data in said  
2 database but before taking steps to correct said address of said first index entry,  
3 determining if said address of said first index entry is valid and then correcting said  
4 address only if it is invalid.

1           48.     The method of claim 47, wherein determining if said address of said  
2 first index entry is valid comprises comparing the unique token of said first index

3 entry to the unique token associated with a segment located at said address, and  
4 ascertaining if said unique tokens are the same.

1 49. The method of claim 47, wherein determining if said address of said  
2 first index entry is valid comprises comparing a segment code of said first index entry  
3 to a segment code associated with a segment located at said address, and if said  
4 segment codes are the same, then comparing the unique token of said first index entry  
5 to the unique token associated with said segment located at said address, and  
6 ascertaining if said unique tokens are the same.

1 50. The method of claim 26, wherein after a reorganization of data in said  
2 database but before taking steps to correct said address of said first index entry,  
3 determining if said address of said first index entry is valid and then correcting said  
4 address only if it is invalid.

1 51. The method of claim 50, wherein determining if said address of said  
2 first index entry is valid comprises comparing the unique token of said first index  
3 entry to the unique token associated with a segment located at said address, and  
4 ascertaining if said unique tokens are the same.

1 52. The method of claim 50, wherein determining if said address of said  
2 first index entry is valid comprises comparing a segment code of said first index entry  
3 to a segment code associated with a segment located at said address, and if said  
4 segment codes are the same, then comparing the unique token of said first index entry  
5 to the unique token associated with said segment located at said address, and  
6 ascertaining if said unique tokens are the same.

1 53. The method of claim 31, wherein after a reorganization of data in said  
2 database but before taking steps to correct said address of said first index entry,  
3 determining if said address of said first index entry is valid and then correcting said  
4 address only if it is invalid.

1           54.     The method of claim 53, wherein determining if said address of said  
2 first index entry is valid comprises comparing the unique token of said first index  
3 entry to the unique token associated with a segment located at said address, and  
4 ascertaining if said unique tokens are the same.

1           55.     The method of claim 53, wherein determining if said address of said  
2 first index entry is valid comprises comparing a segment code of said first index entry  
3 to a segment code associated with a segment located at said address, and if said  
4 segment codes are the same, then comparing the unique token of said first index entry  
5 to the unique token associated with said segment located at said address, and  
6 ascertaining if said unique tokens are the same.

1           56.     The method of claim 37, wherein after a reorganization of data in said  
2 database but before taking steps to correct said address of said first index entry,  
3 determining if said address of said first index entry is valid and then correcting said  
4 address only if it is invalid.

1           57.     The method of claim 56, wherein determining if said address of said  
2 first index entry is valid comprises comparing the unique token of said first index  
3 entry to the unique token associated with a prefix component of a segment located at  
4 said address, and ascertaining if said unique tokens are the same.

1           58.     The method of claim 56, wherein determining if said address of said  
2 first index entry is valid comprises comparing a segment code of said first index entry  
3 to a segment code associated with a prefix component of a segment located at said  
4 address, and if said segment codes are the same, then comparing the unique token of  
5 said first index entry to the unique token associated with said prefix component of a  
6 segment located at said address, and ascertaining if said unique tokens are the same.

1           59.     A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 1.

1           60.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 7.

1           61.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 13.

1           62.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 19.

1           63.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 22.

1           64.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 26.

1           65.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 31.

1           66.    A program storage media readable by a machine and containing  
2 instructions for performing the method contained in claim 37.